RESEARCH REVIEW: AI PLANNING AND SEARCH

STRIPS (Stanford Research Institute Problem Solver), is a problem solver developed by Richard E. Fikes and Nils J. Nilsson in 1971 to tackle planning problems. The idea is to model the world as a collection of first-order predicate calculus formula, then attempt to find a series of operators that can transform the original world model to the desired world model. (Richard E. Fikes, Nils J. Nilsson, Winter 1971). The initial motivation was to find a way to solve robotics problems, however overtime, it became a solid foundation for next generations of researchers to build better tools.

ADL (Action Definition Language) is an advancement of STRIPS proposed by Pednaut in 1987. The intuition is that instead of assuming everything not occurring to be false, ADL allows an unknown state which gives it the ability to better describe the real world. (Pednaut, 1987).

PDDL (Planning Domain Definition Language) is a language developed by Drew McDermott and his colleagues in 1998 which eventually became a standard for planning languages. The expressiveness and formalization of the language made it become a big stepping stone for subsequent research to model the problems easier. PDDL became the standard language for the 1998 International Planning Competition.

Some applications

Despite the dominance of statistic-based approaches such as machine learning in recent years, there are still some efforts to make use of the classical planning approach for AI problems. This project is an interesting example: https://github.com/primaryobjects/strips . By modeling popular problems such as Tower of Hanoi or even Starcraft in a PDDL-wrapper Node.js library called strip.js, the author was able to solve some simple tasks such as building a barrack or training a marine.

References

Richard E. Fikes, Nils J. Nilsson (Winter 1971). "STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving"

Pednault. Formulating multi-agent dynamic-world problems in the classical planning framework. In Michael Georgeff and Amy Lansky, editors, Reasoning about actions and plans pages 47-82. Morgan Kaufmann, San Mateo, CA, 1987.

McDermott, Drew; Ghallab, Malik; Howe, Adele; Knoblock, Craig; Ram, Ashwin; Veloso, Manuela; Weld, Daniel; Wilkins, David (1998)